Fertilizers Recommendation System For Disease Prediction

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LITERATURE SURVEY

1.1 SUMMARY OF LITERATURE SURVEY

Declining soil health is a major problem in India, affecting nearly 120 million hectares of land constituting 37% of the total geographic area. Soil degradation poses a significant threat to India's food security, due to its negative impact on long-term crop yields, which are crucial for feeding a burgeoning population. Imbalanced fertilizer use, a negative consequence of the Green Revolution, is one of the primary causes of soil degradation and adversely impacts the environment, human health, and farm profitability.

Thereafter, lessons from field studies were consolidated into system requirements for the fertilizer recommendation system, and methods were proposed to address them. Lastly, a layered architecture is presented to implement the desired features of the recommendation system in an integrated manner.

1.2 PURPOSE OF FERTILIER RECOMMENDATION SYSTEM

The purpose of the fertilizer recommendation system is to provide farmers with actionable fertilizer advice. For scalability, the recommendations will be disseminated through information and communication technology channels, primarily mobile phones. Bridging information gaps through communication technology channels can overcome the problem of access to trained personnel, making knowledge more widely available. Thus, an integrated, end-to-end solution in the form a point-of-use sensor combined with a recommendation

system is intended to enable widespread adoption of site-specific nutrient management and facilitate the shift towards sustainable agriculture.

1.3 NATURE OF FERTILIZER RECOMMENDATION INFORMATION

Farmers need a wide range of information, depending on the geographic region, farming type, stage of crop cycle, nature of the market etc. From an economic point of view, agricultural information can be a public good or a private good. Fertilizer recommendations form a small subset of farmers' information needs and fall under the category of private information due to their high specificity.

1.4 OBJECTIVE OF THE FERTILIZER RECOMMENDATION SYSTEM

The purpose of the conjoint experiment is to answer the following questions:

1) Is it really necessary to go beyond typology-based customization for fertilizer recommendations?

2) If yes, to what extent? And how?

The experimental logic to answer these questions is laid out as thus. We choose farmers from a demographically similar typology and ask them to choose between two fertilizer products with varying attributes. We analyze the choice data to estimate farmer preferences towards the attributes, both individually and as a group. Next, we study the variability in individual preferences and observe if the variability can be explained by demographic factors. If they do, it means that a demographic typology-based approach is adequate for providing fertilizer recommendations. On the other hand, if they don't, it justifies further customization.

1.5 SURVEY PROTOCOL

Surveys were conducted with farmers in small groups of 5/6 in locations they are comfortable with such as temple, community hall, and for the most part, their homes. Each survey consisted of three sections –

1) Demographic section filled by us

2) Conjoint section filled by the respondents themselves

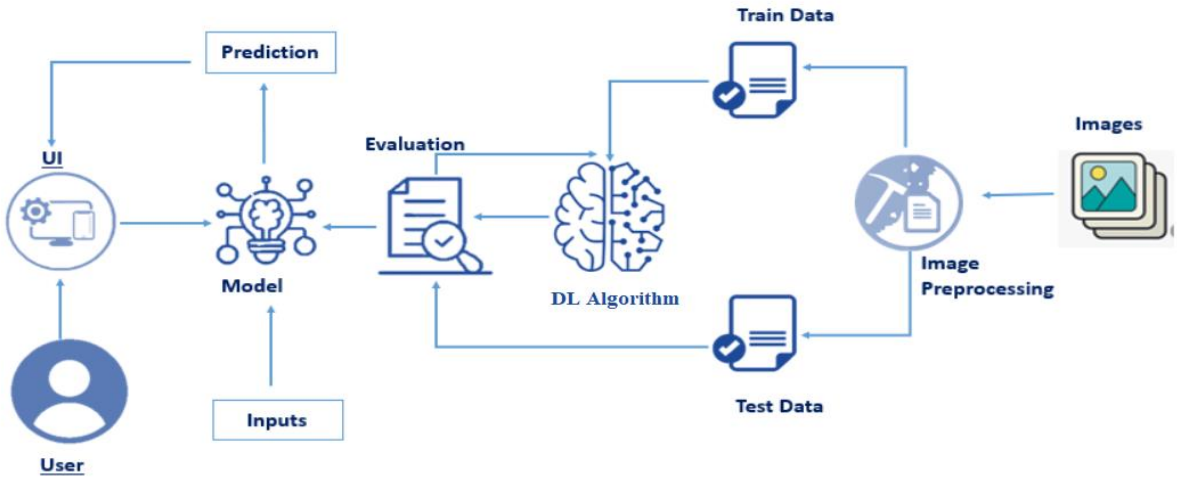
3) Supplementary questions filled by the respondents as well. A copy of the interview is attached in Appendix A.

The demographic section contained questions about age and education level, and also about crops, yields, income, and fertilizer expenditure. The conjoint section consisted of 8 questions, with 2 options in each question representing two different fertilizer profiles. Farmers had to choose one fertilizer that they will buy. There was no none option. The third section contained two questions - about level of comprehension of the survey and satisfaction with current fertilizer practice respectively. Surveys were conducted with the help of CINI staff at Alanganallur. Assistance was also provided by Community Resource Persons (CRPs), who are village residents designated by CINI to act as field coordinators for implementing CINI ’s own programs in the villages.

1.6 SYSTEM ARCHITECTURE

In addition to solutions meeting individual feature requirements, we also present a layered architecture which enables the fertilizer recommendation engine to be implemented in an integrated manner. The layered architecture envisions the fertilizer recommendation engine as a series of information processing layers which increase the actionability of information as it passes through them sequentially. Each layer also makes use of supplementary

information stored in databases to execute its function. Two types of data are stored - data about farmers and data about recommendations.



1.7 CONCLUSION

Agriculture is the most important sector in today's life. Most plants are affected by a wide variety of bacterial and fungal diseases. Diseases on plants placed a major constraint on the production and a major threat to food security. Hence, early and accurate identification of plant diseases is essential to ensure high quantity and best quality. In recent years, the number of diseases on plants and the degree of harm caused has increased due to the variation in pathogen varieties, changes in cultivation methods, and inadequate plant protection techniques. An automated system is introduced to identify different diseases on plants by checking the symptoms shown on the leaves of the plant. Deep learning techniques are used to identify the diseases and suggest the precautions that can be taken for those diseases.